02 MARCH 2006
RESEARCH MONOGRAPH #12

We Can See Clearly Now:

The Limits of Foresight in the pre-World War II Revolution in Military Affairs (RMA)

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We Can See Clearly Now: The Limits of Foresight in the pre-World War II Revolution in Military Affairs (RMA) [1]

There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy.
–Shakespeare, *Hamlet,* Act I, Scene 5.

Introduction

RMA narratives tend to depict today's policy struggle as pitting clear vision and foresight on one side against parochial interests and bureaucratic inertia on the other. For each of today's RMA schools the general contours of a prospective revolution seem clear. From within these perspectives, risk seems mostly associated with the prospect of failing to enact change in a timely fashion. But this view depreciates the very substantial uncertainty surrounding RMA prescriptions – not to mention the significant disagreements and discontinuities among the different transformation schools and service visions. [See *Appendix: A note on trends in US thinking about military transformation.*]

How do we choose between competing RMA schools and visions? Which putative capabilities will actually fulfill their promise, at what cost, and in what time frame? What new constraints and vulnerabilities will attend these new capabilities? What specific capabilities will the future security environment require most?

While it is true that parochial and institutional interests resist change, the uncertainty associated with the questions posed above suggests that progress demands something more than simply sweeping away bureaucratic impediments. At minimum, there must be a complementary recognition of the problem and risk of "choosing wrongly" or overstating the putative benefits of any particular development pathway. In short: pursuit of or adaptation to a prospective RMA must be qualified by a recognition of "RMA uncertainty".

Profound uncertainty attends every military revolution – a pivotal fact that is often obscured in historical accounts of successful RMAs. Once the value of an RMA vision has been empirically established in war, there is a tendency, looking backward, to conclude that its truth should have been more broadly evident earlier. Thus, the practical success of an RMA vision is treated not as the verification of a hypothesis, but rather as a reward – victory – paid to those who exercise vision.

In RMA historiography, the prior arguments against a vision and the doubts initially surrounding it are often treated as never having had much ground or plausibility. This recasts the principal challenge of military transformation as one of "getting it done" rather than one of "getting it right". And it occludes what may be the defining characteristic of RMA "early adopters": their willingness (or perceived need) to take substantial risks.

The Fog of Transformation

In the transformation discourse, the archetypal worst-case scenario is an "RMA breakout" by an adversary, culminating in an operational surprise of strategic significance. Historically, this case is represented by German successes during the early years of the Second World War. These reflected a new combined arms synthesis centered on protected mobility, close air-land cooperation, radio communication, and more flexible command and control arrangements. This constituted an RMA insofar as it resolved the impasse of static fronts, restoring rapid operational maneuver to the battlefield.

Today the failure of the Allied powers to have transformed their own militaries sooner and more thoroughly is regarded with a mixture of surprise and disdain. But force structure and operational concepts whose value seem obvious today – more than 60 years after having been decisively demonstrated – were anything but clear during the 1920s and 1930s, when multiple potential paths of "revolutionary modernization" vied for attention and resources.

Prior to the Second World War a wide variety of new combat systems and operational concepts were being explored, but even the most basic questions about their value and application

remained unsettled. What was the appropriate role and mix of armor, infantry, mechanized infantry, and artillery assets in ground operations? How should these be combined and what operational concepts should govern their use?

Similar questions applied in the realm of airpower (regarding fighters, ground support aircraft, and long-range bombers) and naval power (regarding aircraft carriers, surface combatants, and submarines). New types of forces – for instance, amphibious and airborne – posed new questions. Larger issues were unsettled as well: how should ground, air, and naval power be integrated? Regarding war dynamics: on the eve of the western war in spring 1940, analysts still were debating the relative potential of offensive and defensive operations in a conflict between capable and well-prepared peers. [2]

The only and final arbiter of such questions is war itself – and not "war in general", but a historically specific war, fought in specific theaters and involving specific adversaries with specific sets of competing objectives. In order to "get it right" in advance of war, it is not enough that a nation correctly identify the general contours of a putative revolution; it must also correctly foresee the circumstances of a future war – the theater(s), the adversaries, and the objectives. These circumstances decide which aspects of a potential revolution are critical and which are not – a distinction that pertains to resource allocation. Of course, the challenge of foresight is somewhat mitigated for revisionist, war-seeking powers because they choose the initial time, place, mode, and goal of engagement. Germany's neglect of the "aircraft carrier revolution" was not a critical failing – given the war it chose to start. Likewise, Japan's weakness in mechanized warfare during the 1940s was not pivotal, insofar as it chose a "Go South" strategy after its 1939 clash with the Soviet Union.

Revolutionary regimes and military transformation

Germany's pre-war advantage derived more from its willingness to run risks than from a monopoly on insight. A willingness to accept substantial risk is a common characteristic of RMA "early adopters". Early adopters do not typically make action contingent on the resolution of uncertainty or on the formation of a firm and broad consensus in support of transformation. Instead, national leadership forces the issue. It is not surprising that in the modern era, beginning with the French revolution, RMA "early adopters" have tended to be politically revolutionary regimes or dictatorial ones dedicated to revisionist strategic agendas. It is not that such regimes see the future more clearly, choose modernization pathways more wisely, or value innovation more deeply. Indeed, such regimes are as likely to murder innovators as promote them – consider the contrasting cases of Tukhachevskii in Stalinist Russia and Guderian in Hitlerite Germany. But these regimes are often more willing to act boldly (or rashly) and more able to make an institutional clean sweep. Moreover, they often embrace strategic agendas that require nothing less.

Nazi Germany's propensity for risk-taking reflected the character of its ruling regime, its revisionist international goals, and a perception that its window of opportunity might soon close.

Germany's revisionist goals, which threatened the vital interests of four peer powers, seemed achievable only if its military was willing to take extraordinary operational risks. Thus, the Nazi desire to rapidly redraw the map of Europe translated into a willingness (or requirement) to accept what others might see as extreme risk. Moreover, the revolutionary character of the regime, which had little compunction about upsetting the German institutional *status quo,* helped enable transformation.

Because radical military transformation manifestly involves substantial uncertainty and risk, democratic states and *status quo* powers are seldom "first out of the gate" in undertaking them – although desperate circumstances may sometimes compel them to act early and decisively. In normal circumstances, such nations are more inclined to gradualist, piecemeal change, which can at times add up to an ill-defined and eclectic sort of transformation.

Audacity versus caution: a cost calculus

Both the United States and Great Britain seem to have paid a price at the outset of the Second World War for having delayed transformation. But delay also meant that they averted the risk of choosing a mistaken or irrelevant path of change. The war's "early RMA adopters" helped clarify for those who followed what would work and what would not.

Once Germany had decisively demonstrated the revolutionary potential of a new military paradigm and used it to devastating effect in attacking France and Russia, it became a matter of national survival for the Allies to adapt to it. Germany's stunning successes swept away much of the institutional resistance to change on the Allied side. Its practice of blitzkrieg also clarified the true contours of the new revolution, mooting a debate that had raged since the end of the First World War. With regard to transformation, these acts altered the Allies' risk calculus – dramatically reducing the uncertainty surrounding transformation and sharply increasing the risks of inaction. Similarly, the Japanese attack on Pearl Harbor, by virtue of what it accomplished and how, propelled forward a revolution in US naval doctrine and operations.

Audacity and ruthlessness are hardly sufficient to guarantee effective transformation, of course. Nor can we win a guarantee by adding systematic observation, experimentation, and institutional flexibility to the mix. There is always considerable, residual uncertainty because no two conflicts are the same, experiments only model reality, and adversaries can evolve and adapt in unpredictable ways. For these reasons, successful battlefield applications of novel fighting concepts always involve a degree of luck.

While "audacity" may be a common characteristic of RMA "early adopters", it comes with a price. Two actually. The first, and more obvious, is the risk of choosing and investing wrongly. But even when audacity enables an RMA breakthrough, it can also propel practitioners beyond their "culminating point of success" (to use strategic analyst Edward Luttwak's apt phrase).

The German combat method was as risk laden as its vision. Germany's application of the new synthesis depended on surprise and speed of execution in order to disrupt and dislocate adversary forces – a sudden and deep thrust with an armored rapier. However, there were distinct vulnerabilities: the Wehrmacht's armored "rapiers" (1) lacked the firepower and supporting forces to overwhelm well-equipped and stalwart defenders – especially if arrayed in depth; (2) they were susceptible to being "cutoff" and enveloped when fighting a responsive opponent; and, (3) they could not easily sustain their independent momentum beyond several weeks. The German gamble paid handsomely in France, but came up short in Russia where a variety of additional factors further strained the effort: terrain, weather, distance, time, and the vastness of the country and its population. In this context, the Russians developed an effective riposte – their own application of the new synthesis (discussed below).

The pre-war French defense posture: a case of "RMA refusal"?

Among the European powers, Germany was not alone in fully committing before the war to a distinct vision of future warfare – a distinct view of what might and might not be accomplished on the battlefield using modern weapons. France did too. Like Germany, France chose a modernization path that reflected its strategic circumstances, its goals, and its understanding of future war dynamics.

Although France's air and land forces proved distinctly ineffective in the defense of France, both branches had been striving since mid-decade to keep apace of relevant technical and organizational innovations, as best they understood them. The air force, independent since 1933, had focused since 1936 on the revolutionary mission of strategic bombardment – to the detriment, unfortunately, of battlefield interdiction and ground support missions. Contrary to popular misconceptions, some sections of the ground forces also spent the later part of the 1930s evolving new, if ultimately unsuccessful, mechanized units.

During the interwar years France devoted a greater proportion of national product to defense than did any other power. This effort produced not only the Maginot Line, but also an artillery arsenal that was both larger and qualitatively superior to the German. The French tank fleet also was larger than the force Germany deployed in the west and technologically competitive in many respects. In terms of air power: many French bombers and fighters were competitive with their German counterparts, although much less numerous where it counted: in operational units. Regarding battlefield air support and interdiction, German capabilities were far superior – as were German provisions for airpower command, control, and communications. Most important, the German approach to combining arms and its concept of operations produced a unique synergy among its battlefield systems, as noted earlier. This enabled Germany to accomplish operational feats that others thought impossible. Based on this it was able to implement a campaign plan that unhinged French defensive preparations.

Today, France's pre-war posture is regarded as a prime example of "RMA refusal". The Maginot Line, which had consumed about 20 percent of French defense spending, figures

centrally in this assessment as a symbol of old thinking rendered (literally) concrete. Of course, that is not how the French thought of the Line at the time: most saw it as a technological marvel – a cutting-edge innovation reflecting the lessons of the previous war. And, although the Maginot Line has come to symbolize the futility of static defenses in an age of mechanized warfare, it was never intended by its designers to operate apart from regular forces including mechanized ones. In the actual event, the French provided fewer mobile reserves to support the line than the design required. Most of the best forces had been sent far "forward" into Belgium and Holland, to the north of the line.[3] (This suggests a possible remedy short of the French reconceptualizing their defense posture: Minimally, they might have retained a more capable strategic reserve behind the line and not defended so far forward in the lowlands. This might have been enough to spoil the German attack.)

Critics also point out that French artillery – however powerful – proved to be overly-centralized and inflexible. Nonetheless, the French defense establishment considered its artillery branch to be "scientifically-organized" in accord with advanced Taylorist principles. This, the High Command felt, gave them the ability to mass and concentrate artillery fire and maneuver it adroitly enough to blunt potential enemy breakthroughs.

French ground force development before the war

Since the early 1930s the French ground forces had been experimenting with mechanized cavalry concepts. Utilizing a mix of light and medium tanks, they created the first such division in 1935, calling it "Light Mechanized". In response to the formation of German Panzer Divisions, the French also decided in 1935-1936 to build their own armored divisions, although they designed and used them for infantry support. They fielded their first one in September 1939. This, after having observed the 1 May 1937 roll-out of a Panzer Division in Berlin and having reviewed the lessons of armor use in the Spanish Civil War – which confirmed rather than upset their prejudices. The French also conducted their own experimental trials and exercises in 1937-1938.

Due to resource constraints the armored divisions incorporated fewer tanks than originally planned. Both types of French mechanized divisions also ended up with a less capable mix of tanks than planned. The designers had hoped to equip the mechanized cavalry divisions with a higher proportion of the excellent Souma-35 tank; similarly, armored leaders had hoped originally that their divisions would employ twice as many of the powerful Char-B1 battle tanks. Among the factors that weighed against these goals was the purchase during the 1930s of many types of lighter tanks and armored vehicles, a growing emphasis on aircraft procurement (which gave the air force many more planes than it could absorb), and the continuing requirements of the Maginot Line.

The tensions among these various procurement priorities occurred in the general economic context of France's steep relative decline *vis a vis* Germany: by 1940 France's economy was approximately one-third as large as Germany's. Attention to France's relative economic

condition also casts a different light on its adherence to conscription. Building a professional army was not simply an option that France refused for political or ideological reasons; it was a choice that would have posed an irresolvable allocation dilemma for France, already strapped for funds and suffering a deeply divided polity.

"Enduring lessons" or 20/20 hindsight?

With the benefit of hindsight, France's preparations for war with Germany are an easy target of critique. It is another matter, however, to derive guidelines that might reliably help us avoid errors in our present efforts to envision future war and prepare for it. In fact, French planners conformed in a general way to dictums that are today supposed to help planners avoid obvious mistakes. They sought to "learn the lessons of the last war" and not prepare to re-fight it. But for the dominant clique in French leadership this meant resisting the "cult of the offensive" that had sent millions to their deaths against barbed wire and artillery during the Great War.

This disposition did not imply the abandonment of offensive capabilities and operations altogether. But it did place emphasis on defensive preparations and defensive operations in the opening stages of war as a way of buying time and setting the stage for a subsequent counter-offensive. This approach also accorded with the French leadership's assessment of what types of support it might expect from its allies, how much, when, and under what circumstances. In other words, France's strategic disposition reflected its view of its strategic circumstances.

A key French failing was their depreciation of the potential pace of mechanized air-land warfare. This affected their estimation of force mobility requirements and of command and control needs. Also key was the French underestimation of the potential punch of concentrated armor and the potential contribution of air power in the battlefield interdiction and close support roles (that is, with combat aircraft configured as "flying artillery"). Given the benefit of hindsight it is tempting to say that these emergent capabilities and their implications should have been obvious to anyone who cared to look seriously with an open, active mind. But even the German general staff (or most of it) failed to appreciate fully what might be accomplished against France – even as the attack was underway.

The German decision to proceed with a bold plan for the conquest of France – a plan that fully tested their presumed new capabilities – was contingent on Hitler's feverish intervention and on the fact that the original, more conservative German plan had accidently fallen into Belgium hands, forcing its abandonment. In this light, it is unclear what type of enduring lesson France's failure of foresight is supposed to teach – apart from a general (and rather risky) prescription to "assume the worst (or most audacious)" case and "take bold action".

France's choice: the "thinkable" alternatives

Had the French been better apprised of armor's potential, what should they have done differently? For many of the armor visionaries of the 1930s (and many of today's visionaries as well) the answer seems clear: build an army like Germany's and adopt similar operational concepts. Of course, the archetypal Panzer corps that rolled through France in spring 1940 was not available for copying six months before. They had been undergoing constant and rapid evolution as a result of their combat experiences, which had upset a number of German preconceptions about how best to use armor in battle.

Had the French decided to concentrate their armor and emphasize its independent role, they more likely would have followed the lead of Charles De Gaulle. His proposals involved overly-large armor divisions – incorporating almost twice as many tanks as the Panzer divisions that attacked France. France might have traded in its six-plus light mechanized and armored divisions for two or three of De Gaulle's design. But these would have proved relatively ponderous, inflexible, and scarce. The deficiencies in De Gaulle's conception are obvious in hindsight, but the French would have had to learn them the hard way: in encounter battles with the Germans.

A more serious impediment to following De Gaulle's lead or to closely copying the Germans was that their visions seemed at odds with France's general strategic disposition. The German force design as applied early in the war was optimized for large-scale offensive penetration of unfriendly territory. This accorded with Germany's strategic disposition and goals, which were very different than those of the French.

The French assumed that they would be fighting, at least initially, on friendly soil and with the benefit of prepared positions and short logistics pipelines. This was supposed to convey an operational advantage that the French leadership felt compelled to exploit fully. A number of factors figured into this strategic calculation: alliance requirements, resource and personnel constraints, and domestic political issues. Perceiving a distinctly unfavorable strategic balance, the French felt that what they needed most was to preserve their defensive depth and stall for time. In this context it was hard to accept as a basis for planning an approach that seemed prepared to turn eastern France into a churning sea of encounter battles. Nor, given the strategic balance, were French leaders impressed by the prospects for defending France by attempting an early counter-offensive into Germany. The idea of countering a threat to Paris by attempting to threaten Frankfurt was a non-starter – unless the means of threat was limited to strategic air power.

The road not taken: an option "outside the box"

The French interwar debate posed an opposition between the "Maginot Line mentality" and proposals for offensively-oriented armored warfare. Most present day historical accounts are content to remain within this dyadic framework. But now, as in the past, this reflects a limitation

of critical vision. Stepping outside this framework, we might appreciate that the Maginot Line or something like it could have had a positive role to play in a successful defense of France, working in combination with mechanized forces (as originally intended) to block, brake, and canalize an aggressor. With a better appreciation of the potential of armored warfare, France might have sensibly adjusted its preparation of the battlefield by supplementing the Maginot Line (or partially replacing it) with an area defense scheme of greater depth. The final, essential element would have been to fully integrate into this scheme air power and fast-moving, hard-hitting armored forces.

Unfortunately the French interwar debate on armored forces conflated strategic, operational, and military-technical issues. There was no necessary contradiction between building a powerful combined-arms mechanized force and assuming an operationally defensive orientation (with or without the Maginot Line). In fact, the basic principles of the mid-century RMA were perfectly amenable to concepts of area defense and to defensive operations generally. They could serve a defensive strategy as easily as an offensive one. The obfuscation of this reality was as much the fault of the visionaries as it was the fault of their orthodox and establishment opponents. Most armor and air-land battle visionaries suffered from a sort of "tunnel vision": they focused attention on the offensive potential of the new forces, leaving defensive applications less articulated.

A notable exception was BH Liddel-Hart, who matched his offensive concept of the "expanding torrent" with the defensive concept of a "contracting funnel". But it was only in the course of the war that the new armored forces and area defense schemes were made to mesh effectively, producing pivotal victories for the Allies in the battles of Alam Halfa (1942) and Kursk (1943).[4] And, of course, the Germans spent the last years of the war applying their acumen to the problems of conducting large-scale defensive operations.

Even during the attack on France the possibility of mounting an effective area defense against an armored thrust was suggested in a four-day battle (June 5 - June 9) that occurred south of Amiens. Here the French 16th Infantry division – effectively lacking armored or air support but situated in well-prepared, mutually-supporting defensive positions and "fortified villages" – resisted five attacks by three heavily-reinforced German divisions (including two Panzer divisions). It is noteworthy that the defenses had been hastily constructed; the division, part of the last-ditch Weygand Line, had received its orders only on May 30. Nonetheless, it took the German divisions two days and cost them significant casualties to fight their way through the French 16th – only to run into a second (weaker) division area which delayed them an additional two. For a simple infantry division this was not a bad showing against Panzer divisions. Similar defensive designs, but with armor and air power added, would help blunt the Panzer threat later in the war.

The French air force: disabled by contending visions

The French air force did not miss the mid-century air power revolution as much as it was consumed by it. RMA historiography sometimes obscures the fact that during the pre-war period revolutionary views on the role of air power pulled in two directions: strategic warfare and battlefield support. The German air force proved well-adapted to the latter mission, but much less prepared for the former. This won it a split decision: victory in France, failure over Britain. In the case of the French air force, the tension between the two revolutionary air power tendencies simply tore the service asunder.

On eve of the war France possessed 4,360 modern military aircraft worldwide – more than Germany had deployed to the West – and they were receiving 800 more per month. Many of the aircraft available to the French air force, including some of British and American design, were competitive with their German counterparts. Nonetheless, in the theater of combat, the French, British, Belgian, and Dutch together flew distinctly fewer combat aircraft than their rival: 1,610 *versus* 3,270. And the French numerical disadvantage in the theater was exacerbated by sortie rates that, by some accounts, were only one-fourth those of the Luftwaffe.

A separate Air Ministry had been established in 1928 and the air force became an independent service in 1933, but the service spent the entire pre-war decade enmeshed in an intense struggle with the army and the government over the definition of its role and missions. Following the theories of the Italian air power visionary General Giulio Douhet, French aviators sought to emphasize the strategic bombardment mission and long-range counter-air operations. They relegated the aerial observation and reconnaissance mission to the reserves and resisted the increasing pressure to build-out the service's capacity for battlefield interdiction and close support of ground forces.

During the critical four years before the war, leadership of the air ministry alternated between advocates of strategic bombardment and those who favored the battlefield mission. Although both represented arguably revolutionary views on the role of air power, their priorities differed as did their views on the relationship between the air force and the army. Rather than serving to reconcile and integrate these views, institutional arrangements and the civilian leadership helped polarize them. Among the consequences were personnel purges – affecting more than 50 percent of the services' officers – rapid compensatory promotion of NCOs, and the mass induction of reservists.

Regardless of the changing proclivities of the civilian leadership, key service leaders persisted in efforts to elevate (or at least protect) the strategic bombing mission. When the air ministry passed into the hands of an army-friendly administration two years before the war, aviators resisted pressure to expand their service in the direction of the battlefield mission. One result was that the air force was unable to absorb the flood of new aircraft made available to it. Many aircraft just sat partially disassembled or in crates; others were dispatched to secondary airfields.

The unending turmoil also impeded the development of the service's infrastructure, logistics system, and command, control, and communications capabilities. Furthermore, the abysmal relationship with the army precluded the emergence of effective air-land coordination. Thus, when the German attack commenced, the air force found itself unable to focus and sustain its efforts, intercept enemy units, or cooperate with ground forces.

Nothing could have revealed, *a priori,* the optimal balance between the "strategic bombing" and "battlefield support" missions. Still, it was something more than internal differences over vision that had reduced the prewar French air force to a dysfunctional state. The case offers several lessons.

Obviously, neither a service nor any element of its modernization program should become a political football. Nor should services associate themselves or their visions with partisan political tendencies. At the same time, the French case argues for limits on service autonomy. The conduct of doctrinal debates and modernization programs should be circumscribed by a broader vision of defense transformation originating at what Americans now call the "joint" level. This, in turn, should be circumscribed by national security interests, goals, and strategy as determined by civilian leadership. Of course, there is no guarantee that higher levels of authority will not themselves succumb to gross partisan distortion and wild policy swings. Nor is there a guarantee that they will duly respect and take into account the professional judgement of service leaders. Indeed, the French case shows how these problems can manifest up and down the chain of authority. Still, this is no reason to allow a degree of service of autonomy that is virtually guaranteed to produce a fragmented military establishment and posture.

Conclusion

Drawing useful lessons from the experience of interwar force developments and their subsequent application requires that we relinquish the privilege of hindsight. The question is: What might the historic players have done differently *given what they knew at the time*? And, moreover: Can their mistaken choices be structurally associated with predispositions that others might avoid? In other words, can we identify a "character flaw" in their planning or execution?

As noted above, the case of the French air force warns against the politicalization of RMA efforts, while also suggesting that service interests can distort RMA development. The troubled experience of French ground force development illustrates how tying an RMA vision closely to a particular strategic disposition (as though one entails the other), can cloud the appreciation of operational opportunities.

The German case points to how a nation's strategic disposition can disable the perception of operational limits. The contours of the new synthesis in land warfare were not fully drawn until Kursk. Before this, what the Germans saw was how a particular instantiation of the new synthesis might resolve, at least temporarily, a particular operational impasse. What the

Russians saw subsequently was how the synthesis might be applied to spoil the German solution. What the French saw was neither.

None of the provisos outlined above promise a way to reliably surmount the problem of RMA uncertainty, of course. At best, they flag some predispositions that can distort the development and application of new capabilities. As always, the real challenge is applying the precepts to entirely novel circumstances.

More generally, several propositions seem true about the role of uncertainty and our efforts to manage it as we contemplate military transformation:

> First, we can somewhat mitigate RMA uncertainty by means of extensive, independent, and competitive experimentation, field trials, and exercises – both single service and joint. We also can seek to sharpen the debate among competing RMA schools, service visions, and branch perspectives – while insulating these from partisan politics and commercial interests.
>
> Second, despite our best efforts, a substantial degree of uncertainty will persist; the only decisive test of vision is war. This humbling fact argues for avoiding over-commitment during periods of great strategic uncertainty, retaining flexibility, and developing our facilities for rapid adaptation. Adaptation is best served by substantial equipment and unit prototyping, which would offer multiple potential paths of development. Also useful is modularization of capabilities, units, and training regimes – an approach that allows rapid change through "add-ons" and supplemental training.
>
> Third, pervasive uncertainty tends to strengthen the position of the *status quo,* especially during periods of significant strategic change. For institutional reasons, the default position may be to extend the *status quo* into the future. However, this is not a neutral position. When the world is changing rapidly the preservation (or recapitalization) of the *status quo* involves a "future vision" as risky and open to question as any – if not more so.
>
> Finally, "uncertainty" by itself does not constitute a strong rationale for either sitting still or moving decisively down a new path. It lends positive support only to efforts to reduce uncertainty or improve our capacity to react, recover, and respond to surprise (that is, to adapt).

Appendix: A note on trends in US thinking about military transformation

Recent US visions of military revolution fall into two broad categories: the "info-tech RMA" (IT-RMA) and the "post-modernist RMA" (PM-RMA). The first focuses on how new information technologies might be exploited to achieve dramatic new battlefield effects. The second is more concerned with the effect on warfare of "globalization", transnational phenomena, and newly prominent non-state actors who pose an asymmetric challenge to nation-states.

A third area of interest – cyber-warfare – straddles the two major visions. It is concerned with the emergence of cyber-space as a new domain of conflict.

Illustrative of the type of revolution that concerns the IT-RMA theorists was the emergence of German blitzkrieg methods during the 1930s. Also illustrative is the nuclear weapon revolution, beginning in 1945. The prime concern of IT-RMA advocates is the maturation of new military technologies and their mating with appropriate new operational concepts and organizational structures. In concert, these changes are supposed to make possible new methods of warfare that either resolve or impose an operational impasse of strategic import. (For instance: German blitzkrieg methods resolved the problem of static fronts evident in the First World War. And the nuclear revolution imposed new limits on the use of conventional military power).

The revolution that concerns the PM-RMA theorists is more akin to the emergence of the nation-state, nationalism, and mass armies during the period 1500-1800. They focus on the emergence of new types of strategic agency and agents ("players") whose addition to the global system transforms the nature of war as a social phenomena. (It is worth noting that members of this trend tend to speak of a "transformation of war" or "fourth generation warfare" rather than a "revolution in military affairs.")

The two major "schools" can be further distinguished in terms of their roots in earlier US military policy trends. For the IT-RMA, these include the development during the 1970s and 1980s of the Airland Battle, Follow-on Forces Attack, and Assault Breaker programs. By contrast, the recent policy roots of the PM-RMA vision trace back to American interest in counter-insurgency, low-intensity warfare, and maneuver warfare.

Programmatically, both trends seek to change the armed forces' fighting doctrine, training regimes, leadership style, and organization. But the IT-RMA gives pride of place to the integration of new technology, while PM-RMA theorist tend to emphasize the role of fighting concepts and leadership. (Indeed, among PM-RMA advocates are a significant subset who see the increasing American dependence on complex technologies as a strategic Achilles Heel – an invitation to asymmetric attack.)

The influence of the PM-RMA vision is apparent in concerns about "asymmetric warfare" and in the renewed interest in "small wars", maneuver warfare, and special, psychological, and complex (military-political) operations, including counter-insurgency, stability operations, and nation-building.

In its most developed form, the PM-RMA vision looks beyond the "military-political" intersection to one better called "strategic-ideological". Under the rubric of "fourth-generation warfare", it aims to operationalize the "clash of civilizations" paradigm as *Kulturkampf* – a type of conflict that involves all the ideational agencies of society, not just (or even primarily) the armed services.

The IT-RMA program, in its most recent and ambitious formulation, aims to create "network centric" armed forces. This program sees all military assets as becoming nodes in a network comprising several types of "grids": sensor, information processing, support, and weapon or "strike" grids. Although widely-dispersed, the assets would be highly-mobile, digitally-interlinked, and modular. Ideally, this would enable them to rapidly concentrate in the right combination and at the right time and place to quickly defeat a foe – and then disperse.

Less ambitiously, the IT-RMA program is moving forward unevenly along several pathways, often with service "stovepipes" intact:

- Improved means of reconnaissance and surveillance;
- Better integrated communications systems;
- Increased emphasis on electronic warfare;
- Greatly increased capacities for precision strike;
- Digitization and modularization of ground forces; and
- More responsive systems for provisioning forces in combat.

To date, the greatest achievement of the IT-RMA architects has been to fashion something resembling the old Soviet notion of a "reconnaissance-fire complex" – mostly involving air power.

Apart from the two major (and one minor) RMA visions, the Pentagon is also pursuing a global defense posture realignment and, of course, routine modernization of the US arsenal continues apace.

Notes

1. For the purposes of this essay I define two forms of military revolution (although we are principally concerned with the first): (1) Change in the military sphere can be considered revolutionary if it resolves or establishes an operational impasse of strategic significance. Such a change is manifest in dramatic new battlefield effects that upset core expectations about what armed forces in conflict can accomplish. (2) The second meaning of military revolution involves the emergence in the world system of new strategic agents or forms of agency that alter the character of war as a social phenomena. Here the manifest effect concerns some combination of the geographical extent, duration, object, instruments, scope, duration, or dynamics of war – "dynamics" meaning how wars begin, escalate, and end. Characteristically, this second type of

revolution compels a system-wide and discontinuous change in the institutions for managing, preparing for, and conducting conflict.

As a shorthand, the first of these two forms can be thought of as involving the *methods of war* while the second can be thought of as involving the *employment of war as an instrument of policy*. Regarding their relation: the first type may prompt the second, while the second often involves the first as well. While I refer to both types of revolution as a "revolution in military affairs", common usage is to refer to the first only as an RMA, while reserving the phrase "transformation of war" for the second.

2. Neither Germany's swift subjugation of Poland, nor the Soviets' quick defeat of two divisions of the Japanese Kwantung Army along the Mongolia-Manchuria border, both in 1939, settled the debates. The Polish September Campaign did not count as a contest of peers. As for the early Soviet-Japanese clash: at the time, neither the scope nor the details of the battle were widely known or propagated. Moreover, the strategic circumstances in the East appeared different enough from those in the West to make it easy to dismiss the battle's lessons as irrelevant. That notwithstanding, the battle did clearly show the potential of combined arms operational maneuver and the vulnerability of World War I-type defenses.

3. In 1940 the French fielded 18 mechanized and motorized divisions (armored, cavalry, and infantry); in addition, they had about 118 older-style divisions. Their campaign plan sent most of the mobile divisions and the best regular infantry divisions into Belgium and Holland. Here they became trapped when a torrent of German mechanized divisions circumvented the Maginot Line and flooded through a (supposedly impassable) gap between it and the defensive line in Belgium. Had the French held back a strategic reserve of mobile divisions they might have been able to stem this torrent. At any rate, the Maginot Line did serve as an effective barrier along most of its extent.

4. At Kursk, the Red Army employed a version of the new synthesis tailored to halting and rolling back the German challenge. This involved arraying their defenses in great depth – thus, establishing a combined-arms *area* (rather than *linear*) defense that absorbed the German thrusts and provided a supportive context for local counter-attacks. Once the German forces were sufficiently depleted, the Red Army would launch large-scale counter-offensives. The defensive scheme at Kursk is discussed in some detail in Conetta, Knight and Unterseher, *Defensive Military Structures in Action: Historical Examples* (Cambridge MA: Commonwealth Institute, September 1997).

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